U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Ranunculus hawaiensis*

COMMON NAME: Makou

LEAD REGION: Region 1

INFORMATION CURRENT AS OF: April 2010

STATUS/ACTION

___ Species assessment - determined we do not have sufficient information on file to support a proposal to list the species and, therefore, it was not elevated to Candidate status
___ New candidate
_X__ Continuing candidate
___ Non-petitioned
_X__ Petitioned - Date petition received: May 11, 2004
__ 90-day positive - FR date:
_X_ 12-month warranted but precluded - FR date: May 11, 2005
_N_ Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:
a. Is listing warranted (if yes, see summary of threats below)? Yes
b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? Yes
c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded.
Higher priority listing actions, including court-approved settlements, court-ordered and statutory deadlines for petition findings and listing determinations, emergency listing determinations, and responses to litigation, continue to preclude the proposed and final listing rules for the species. We continue to monitor populations and will change its status or implement an emergency listing if necessary. The "Progress on Revising the Lists" section of the current CNOR (*http://endangered.fws.gov/*) provides information on listing actions taken during the last 12 months.

_N_ Listing priority change
Former LP: ___
New LP: ___
Date when the species first became a Candidate (as currently defined): February 21, 1990
___ Candidate removal: Former LP: ___
___ A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.
___U – Taxon not subject to the degree of threats sufficient to warrant issuance of a

proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

___ F – Range is no longer a U.S. territory.

___ I – Insufficient information exists on biological vulnerability and threats to support listing.

___ M – Taxon mistakenly included in past notice of review.

___ N – Taxon does not meet the Act's definition of "species."

___ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Flowering plants, Ranunculaceae (Buttercup family)

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Hawaii, islands of Hawaii and Maui

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Hawaii, islands of Hawaii and Maui

LAND OWNERSHIP: *Ranunculus hawaiensis* is known from six populations: three populations on State land (Mauna Kea and Kapapala Forest Reserves on the island of Hawaii); two populations on Federal land (Hawaii Volcanoes National Park and Hakalau NWR on the island of Hawaii); and one population on state land on Maui (Waikamoi Preserve).

LEAD REGION CONTACT: Linda Belluomini, (503) 231- 6283, linda_belluomini @fws.gov

LEAD FIELD OFFICE CONTACT: Pacific Islands Fish and Wildlife Office, Christa Russell, 808-792-9400, christa_russell@fws.gov

BIOLOGICAL INFORMATION

Species Description

Ranunculus hawaiensis is an erect or ascending perennial herb 20 to 79 inches (in) (50 to 200 centimeters (cm)) tall with fibrous roots. Stems are densely covered with golden or whitish hairs. Basal leaves are twice compound, with leaflets lanceolate with the terminal one largest and irregularly toothed and lobed. The yellow, glossy flowers are numerous in branched open cymes and contain a scale-covered nectary at the base. Achenes are numerous in an ovoid head and are margined with a narrow wing (Wagner *et al*. 1999, p. 1,088).

Taxonomy

*Ranunculus hawaiensis w*as described by Asa Gray (1854). This species is recognized as a distinct taxon in Wagner *et al.* (1999, p. 1,088), the most recently accepted Hawaiian plant taxonomy.

Habitat/Life History
Typical habitat is mesic to wet forest dominated by *Metrosideros polymorpha* (ohia) and *Acacia koa* (koa) with scree substrate at elevations between 6,000 and 6,700 feet (ft) (1,820 and 2,040 meters (m)) (A. Medeiros, U.S.G.S. Biological Resources Discipline, pers. comm. 2007; L. Pratt, U.S.G.S. Biological Resources Discipline, pers. comm. 2007; Wagner *et al*. 1999, p. 1,088).

Historical Range/Distribution
Historically, *Ranunculus hawaiensis* was wide-ranging on the island of Hawaii, from Kona, Hualalai, Mauna Kea, and Kau. On Maui, this species was known from Haleakala National Park (Hawaii Biodiversity Mapping Program (HBMP) 2008).

Current Range/Distribution
Ranunculus hawaiensis is found on the island of Hawaii in Hawaii Volcanoes National Park Kahuku section, at Kapapala Forest Reserve, and Mauna Kea Forest Reserve at Puu Kanakaleonui and north Kolekole gulch. On Maui this species is known from one sighting on a cliff in the Waikamoi Preserve (K. Bio, Plant Extinction Prevention Program (PEP), pers. comm. 2008; L. Pratt, U.S. Geological Survey, pers. comm. 2008; H. Oppenheimer, PEP, pers. comm. 2006).

Population Estimates/Status
In the 1980s and 1990s, *Ranunculus hawaiensis* numbered several hundred individuals on both Maui and the island of Hawaii. Currently, there are 5 populations totaling 20 individuals. On the island of Hawaii there are 2 individuals on State land above Hakalau National Wildlife Refuge (NWR), 3 individuals at Puu Kanakaleonui in Hakalau NWR, 1 individual at Kolekole gulch, 6 individuals on Federal land at Kahuku (part of Hawaii Volcanoes National Park) and 8 individual at Kapapala Forest Reserve on State Land HBMP 2008; K. Bio, pers. comm. 2008; L. Pratt, pers. comm. 2008; Plant Extinction Prevention (PEP) Program 2008, p. 108. Five individuals were outplanted at Kahuku, on the island of Hawaii in 2007 (L. Pratt, pers. comm. 2007). On Maui, the last observation was in 1995 of a few individuals on a cliff in the Waikamoi Preserve (H. Oppenheimer, pers. comm. 2007). None were found on a survey of Kuiki planeze in Haleakala National Park in 2006; however, the area will be surveyed again (DLNR 2006).

THREATS:

A. The present or threatened destruction, modification, or curtailment of its habitat or range.
Ranunculus hawaiensis is threatened by feral pigs (*Sus scrofa*) and goats (*Capra hircus*) on both islands, by feral sheep (*Ovis aries*) and mouflon (*Ovis musimon*) on Hawaii, and by feral cattle (*Bos taurus*) on Maui (A. Medieros pers. comms. 1996 and 1997; L. Pratt, pers. comm. 2007). All of these ungulates are known to degrade and destroy habitat (Hawaii Biodiversity and Mapping Program (HBMP) 2008). Evidence of the activities of feral pigs, goats, sheep, mouflon and cattle has been reported in areas where *R. hawaiensis* is known to occur (A. Medieros, in litt. 1995; L. Pratt, pers. comm. 2007; N. Agorastos, pers. comm. 2007).

Pigs of Asian ancestry were introduced to Hawaii by the Polynesians, and the Eurasian type was introduced to Hawaii by Cook in 1778, with many other introductions thereafter (Tomich 1986).

Some pigs raised as food escaped into the forests of Hawaii, Kauai, Oahu, Molokai, Maui, and Niihau, and are now managed as a game animal by the State to optimize hunting opportunities (Tomich 1986; State of Hawaii 2001). In a study conducted in the 1980s on feral pig populations in the Kipahulu Valley on Maui, the deleterious effects of feral pig rooting on native forest ecosystems was documented (Diong 1982). Kipahulu Valley consists of a diverse composition of native ecosystems, from near sea level to alpine, and forest types ranging from mesic to wet, *Acacia koa* (koa) and/or *Metrosideros polymorpha* (ohia). Rooting by feral pigs was observed to be related to the search for earthworms, with rooting depths averaging 8 inches (20 centimeters), greatly disrupting the leaf litter and topsoil layers, and contributing to erosion and changes in ground topography. The feeding habits of pigs were observed to create seed beds, enabling the establishment and spread of weedy species such as strawberry guava (*Psidium cattleianum*). The study concluded that all aspects of the food habits of pigs are damaging to the structure and function of the Hawaiian forest ecosystem (Diong 1982).

The goat, a species originally native to the Middle East and India, was successfully introduced to the Hawaiian Islands in 1792. Currently, populations exist on Kauai, Oahu, Maui, Molokai, and Hawaii. Goats browse on introduced grasses and native plants, trample roots and seedlings, cause erosion, and promote the invasion of alien plants. Goats are able to forage in extremely rugged terrain and have a high reproductive capacity (Clarke and Cuddihy 1980; van Riper and van Riper 1982; Scott *et al*. 1986; Tomich 1986; Culliney 1988; Cuddihy and Stone 1990). A study of goat predation on the native koa forest (*Acacia koa*) on the island of Hawaii has shown that grazing pressure by goats can cause the eventual extinction of koa because it is unable to reproduce (Spatz and Mueller-Dombois 1973). An exclosure analysis demonstrated that release from goat pressure by fencing resulted in an immediate recovery in height growth and numbers of vegetative resprouts of koa (Spatz and Mueller-Dombois 1973). Another study at Puuwaawaa on the island of Hawaii demonstrated that prior to management actions in 1985, regeneration of endemic shrubs and trees in the grazed area was almost totally lacking, contributing to the invasion of the forest understory by exotic grasses and weeds. After the removal of grazing animals in 1985, koa and *Metrosideros* spp. (ohia) seedlings were observed geminating by the thousands (Department of Land and Natural Resources 2002).

Sheep have become established on the island of Hawaii (Tomich 1986) since their introduction almost 200 years ago (Cuddihy and Stone 1990). Sheep roam the upper elevation dry forests of Mauna Kea, Mauna Loa, and Hualalai (above 3,300 ft (1,000 m)), causing damage similar to that of goats (Stone 1985). Sheep have decimated vast areas of native forest and shrubland on Mauna Kea and continue to do so as a managed game species (Stone 1985; Cuddihy and Stone 1990).

The European mouflon is a native of Corsica and Sardinia (Clark 1964). They are currently established on the islands of Lanai and Hawaii (Giffin 1982; Pacific Island Ecosystems at Risk 2007). Most are found at higher elevations on Mauna Kea where they were released between 1962 and1966, but they are also known from Kahuku Ranch on the southern slopes of Mauna Loa. Feral sheep-mouflon hybrids are known where range overlaps between the two occur (Giffin 1982). Mouflon sheep are both grazers and browsers. In range studies done on the effects of mouflon grazing and browsing, plant species found to be most affected by sheep were *Sophora chrysophylla* (mamane), *Vaccinium* sp. (ohelo), *Geranium* sp. (hinahina), and native grasses (Giffin 1982; Scowcroft and Conrad 1992).

Cattle, the wild progenitors of which were native to Europe, northern Africa, and southwestern Asia, were introduced to the Hawaiian Islands in 1793. Large feral herds developed as a result of restrictions on killing cattle decreed by King Kamehameha I. While small cattle ranches were developed on Kauai, Oahu, and west Maui, very large ranches of tens of thousands of acres were created on east Maui and Hawaii. Feral cattle can presently be found on the islands of Hawaii and Maui, and ranching is still a major commercial activity. Cattle eat native vegetation, trample roots and seedlings, cause erosion, create disturbed areas into which alien plants invade, and spread seeds of alien plants in their feces and on their bodies. The forest in areas grazed by cattle becomes degraded to grassland pasture, and plant cover is reduced for many years following removal of cattle from an area. Several alien grasses and legumes purposely introduced for cattle forage have become noxious weeds (Tomich 1986; Cuddihy and Stone 1990).

Hawaiian ecosystems, having evolved without disturbance of hoofed mammals, are susceptible to large-scale disturbance by pigs, goats, and other introduced ungulates (Loope *et al*. 1991). Because of demonstrated habitat modifications by feral pigs, goats, sheep, mouflon, and cattle, such as destruction of native plants, disruption of topsoil leading to erosion, and establishment and spread of nonnative plants; the Service believes they are all threats to *Ranunculus hawaiensis.*

B. Overutilization for commercial, recreational, scientific, or educational purposes.
None known.

C. Disease or predation.
Ranunculus hawaiensis is threatened by predation by feral pigs and goats on both islands, by feral sheep and mouflon on Hawaii, and by feral cattle on Maui (A. Medieros, pers. comms. 1996 and 1997; L. Pratt, pers. comm. 2007; PEP Program 2008, p. 108). Browsing by ungulates has been observed on many native plant species, including common and rare or endangered species (Cuddihy and Stone 1990; Loope *et al*. 1991). Browsing has been observed on *Ranunculus hawaiensis* at the Kapapala Forest Reserve population (PEP Program 2008, p. 108). Because Hawaii's native plants evolved without any browsing or grazing mammals present, many lost natural defenses to such impacts (Carlquist 1980).

Pigs are omnivorous in their diet. In the study described above on feral pig populations in the Kipahulu Valley, pigs were observed browsing on young shoots, leaves and fronds of a wide variety plants, of which over 85 percent were endemic species (Diong 1982). A stomach content analysis showed that the pigs' food sources consisted of native plants, 60 percent of which was tree ferns (*Cibotium* spp.), alternating with strawberry guava (*Psidium cattleianum*) when it was available. Pigs were observed to fell plants and remove the bark of *Clermontia*, *Cibotium*, *Coprosma*, *Psychotria*, and *Hedyotis* species (herbaceous and woody plants), with larger trees killed over a few months of repeated feeding. Direct damage to *Ranunculus hawaiensis* by pigs has been observed on the island of Hawaii (R. Warshauer, U.S.G.S. Biological Resources Discipline, pers. comm. 1997).

Predation by goats is a potential threat where populations of *Ranunculus hawaiensis* occur on State lands (N. Agorastos, pers. comm. 2007; J. Jacobs, Army Environmental, Pohakuloa Training Area, pers. comm. 2007). Feral goats eat native vegetation, are able to forage in

extremely rugged terrain, and have a high reproductive capacity. Elimination of rare native plants such as *Argyroxiphium kauense* and *A. sandwicense* ssp. *sandwicense* (Hawaiian silverswords), *Canavalia kauensis* (awikiwiki), and a number of Maui species (*Stenogyne microphylla, Schiedea haleakalaensis*, *Plantago princeps*), from areas heavily foraged by goats has been documented (Cuddihy and Stone 1990).

Feral sheep and mouflon are known to browse numerous native plant species including: *Chenopodium oahuense, Dubautia* sp., *Geranium* sp. *Coprosma* sp., *Myoporum sandwicense, Styphelia tameiameiae, Vaccinium* sp., *Sophora chrysophylla* and native grasses (Giffin 1976, 1982; Scowcroft and Conrad 1992). Therefore, it is likely that feral sheep and mouflon impact this species directly as well as the surrounding habitat.

Slugs are generalist herbivores (Rathke 1985) that feed principally on plant seedlings and low-lying herbs, yet they are not completely indiscriminate in their choices of foods (Dirzo 1980; Joe 2006). While native Hawaiian plants have had to defend themselves against avian, insect and possibly snail herbivory, the defense mechanisms evolved by Hawaiian plants may not be very effective against introduced slugs (Joe 2006). In the Kahanahaiki Management Unit on Oahu, slugs were found to be responsible for substantial seedling mortality of certain native plant species. Of three native species studied, two had significantly higher seedling mortality (50 percent) when exposed to slugs (Joe 2006). Slug damage has been observed on *R. hawaiensis* in cultivation and in the wild (A. Medeiros, pers. comm. 2007). The effect of slugs on the decline of this and related species is unclear, although slugs may pose a threat by feeding on the stems and fruit thereby reducing the vigor of the plants and limiting regeneration (L. Mehrhoff, Service, in litt. 1994). Currently, there is no known control method for this threat.

D. The inadequacy of existing regulatory mechanisms.
Ranunculus hawaiensis is not currently protected under Hawaii's endangered species law (HRS, Sect. 195-D) or the Federal Endangered Species Act (16 U.S.C. §1531-1544).

Pigs, goats, sheep and mouflon are managed in Hawaii as game animals, but many populate inaccessible areas where hunting is difficult, if not impossible, and therefore has little effect on their numbers (Hawaii Heritage Program 1990). Pig, goat, sheep and mouflon hunting is allowed year-round, or during certain months, depending on the area (Hawaii Department of Land and Natural Resources 1999, 2003); however, public hunting does not adequately control the number of ungulates to eliminate this threat to native plant species. Hunting of feral cattle is no longer allowed in Hawaii (Hawaii Department of Land and Natural Resources 1985) except under permitted conditions.

E. Other natural or manmade factors affecting its continued existence.
Ranunculus hawaiensis is threatened by introduced pasture grasses that degrade and destroy habitat and outcompete native plants (HBMP 2008). The nonnative grasses that are reported to be the greatest threats to *R. hawaiensis* on the island of Hawaii are *Pennisetum clandestinum* (kikuyu grass), *Holcus lantanus* (common velvet grass), *Ehrharta stipoides* (meadow rice grass), and *Anthoxanthum odoratum* (sweet vernalgrass) (HBMP 2008; PEP Program 2008, p. 108). Nonnative plants which pose the greatest threats to *R. hawaiensis* on the island of Maui are: *P.*

clandestinum, *H. lantanus*, and *Cymbopogon refractus* (barbwire grass) (A. Medieros, in litt. 1995).

Anthoxanthum odoratum, a grass native to Eurasia, is naturalized on Molokai, Maui, Kauai, and Hawaii (Wagner *et al*. 1999, p. 1,498). This grass forms extensive ground cover in disturbed areas and prevents reestablishment of native species. Seeds are dispersed by wind, water, and animals. The Hawaii Weed Risk Assessment Protocol places this species in the high risk category (Pacific Island Ecosystems at Risk 2009).

Cymbopogon refractus is native to Australia and in Hawaii is naturalized and common in pastures, along roadsides, and in dry, disturbed sites, from sea level to 3,640 ft (0 to 1,110 m) elevation (Wagner *et al.* 1999; Pacific Island Ecosystems at Risk (PIER) 2006a)

Ehrharta stipoides is a grass which drastically alters environments by creating a thick mat in which other species cannot regenerate. The seeds are easily dispersed by awns that attach to fur or clothing (U.S. Army 2006; PIER 2006b).

Holcus lanatus, native to Europe, is naturalized in Hawaii and occurs on poor, moist soils. Velvetgrass is an aggressive weed, growing rapidly from basal shoots or prolific seed and therefore can become dominant if not controlled. Velvetgrass gradually forces other plants out, reducing species diversity. Allelopathy may also play a role in the dominance of velvetgrass over other species (Remison and Snaydon 1980). The most effective control measure is physical removal by hand pulling or hoeing. No effective means of biocontrol have been found (The Nature Conservancy 2005).

Pennisetum clandestinum is native to tropical eastern Africa, and is found on all major Hawaiian Islands from 1,640 to 6,560 ft (500 to 2,000 m) in dry and mesic habitats. It invades wet environments when the forest is disturbed (Smith 1985). Kikuyu grass is one of the most serious pest species threatening native vegetation; its smothering, thick, dense growth prevents virtually any new seedling establishment (Wagner *et al*. 1999; Holm *et al.* 1977).

The original native flora of Hawaii consisted of about 1,400 species, nearly 90 percent of which were endemic. Of the current total native and naturalized Hawaiian flora of 1,817 taxa, 47 percent are introduced species, and nearly 100 species are pests (Smith 1985; Wagner *et al*. 1999). Confirmed personal observations (HBMP 2008) and several studies (Cuddihy and Stone 1990; Wood and Perlman 1997; Robichaux *et al*. 1998, p. 4) indicate nonnative plant species may outcompete native plants similar to *Ranunculus hawaiensis*. Competition may be for space, light, water, or nutrients, or there may be a chemical produced that inhibits growth of other plants (Smith 1985; Cuddihy and Stone 1990). In addition, nonnative pest plants found in habitat similar to that of this species have been shown to make the habitat less suitable for native species (Smathers and Gardner 1978; Smith 1985; Loope and Medeiros 1992; Medeiros *et al.* 1992; Ellshoff *et al.* 1995; Meyer and Florence 1996; Medeiros *et al.* 1997; Loope *et al*. 2004). In particular, alien pest plant species degrade habitat by modifying availability of light, altering soil-water regimes, modifying nutrient cycling, or altering fire characteristics of native plant communities (Smith 1985; Cuddihy and Stone 1990; Vitousek *et al*. 1997). Currently, many widespread alien plant taxa cannot be completely eradicated from the islands of Maui and Kauai,

and therefore are expected to continue dispersing into managed areas (Loope 1998; Smith 1985). Because of demonstrated habitat modification and resource competition by nonnative plant species in habitat similar to that of *R. hawaiensis* the Service believes nonnative plant species are a threat to this species.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED

Three populations have been outplanted into protected exclosures at Hakalau Forest NWR (5 to10 individuals), Mauna Kea FR (8 individuals), and in the Kahuku portion of Hawaii Volcanoes National Park (5 individuals). Nonnative plants are also being controlled within the exclosures (T. Belfield, pers. comm. 2007; L. Pratt, pers. comm. 2007; N. Agorastos, pers. comm. 2007; J. Jeffrey, pers. comm. 2007; P. Moriyasu, Volcano Rare Plant Facility (VRPF), pers. comm. 2009).

This species is represented in ex situ collections at the VRPF and at Hakalau Forest NWR (Service 2005; J. Jeffrey, pers. comm. 2007; P. Moriyasu, pers. comm. 2009).

SUMMARY OF THREATS

Based on our evaluation of habitat degradation and loss by feral pigs, goats, sheep, mouflon, and cattle, and by competition with nonnative plants, we conclude there is sufficient information to develop a proposed rule for this species due to the present and threatened destruction, modification, or curtailment of its habitat and range, and the displacement of individuals of *Ranunculus hawaiensis* due to competition with nonnative plants for space, nutrients, water, air, and light. Predation by feral pigs, goats, sheep, mouflon, cattle, and slugs is a potential threat to *R. hawaiensis.* We find that this species is warranted for listing throughout all its range, and, therefore, find that it is unnecessary to analyze whether it is threatened or endangered in a significant portion of its range.

RECOMMENDED CONSERVATION MEASURES

- Protect all individuals from feral pigs, goats, sheep, mouflon, and cattle
- Control alien plants
- Develop and implement control methods for slugs
- Conduct/update field surveys at known locations and potential habitat
- Reintroduce individuals into suitable habitat within historic range that is being managed for known threats to this species
- Propagate and maintain genetic stock

LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	**Imminent**	Monotypic genus	1
		Species	**2***
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number:

Magnitude:
This species is highly threatened by feral pigs, goats, sheep, mouflon, and cattle that degrade and destroy habitat, and by nonnative plants that outcompete and displace it. This species is potentially threatened by predation by these nonnative animals. Threats to the mesic to wet forest habitat of *Ranunculus hawaiensis*, and to individuals of this species, occur throughout its range and are expected to continue or increase without their control or eradication. Only 18 to24 plants are currently protected from ungulates (L. Pratt, pers. comm. 2007; J. Jeffrey, pers. comm. 2007; P. Moriysau, pers. comm. 2007; N. Agorastos, pers. comm. 2007).

Immediacy of Threats:
Habitat degradation by feral pigs, goats, sheep, mouflon and cattle, and competition with nonnative plants are imminent threats because they are ongoing. Possible predation by slugs is considered nonimminent.

Yes Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed?

Is Emergency Listing Warranted? No. The species does not appear to be appropriate for emergency listing at this time because the immediacy of the threats is not so great as to imperil a significant proportion of the taxon within the time frame of the routine listing process. In addition, individuals of *Ranunculus hawaiensis* will benefit from conservation actions in weed and ungulate-free areas on the island of Hawaii. If it becomes apparent that the routine listing process is not sufficient to prevent large losses that may result in this species' extinction, then the emergency rule process for this species will be initiated. We will continue to monitor the status

of *R. hawaiensis* as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures.

DESCRIPTION OF MONITORING

Much of the information on this form is based on the results of two meetings of 20 botanical experts held by the Center for Plant Conservation in December of 1995 and November 1996, and was updated by personal communication with Arthur Medeiros of the U.S.G.S. Biological Resources Discipline in 1999. We have incorporated additional information on this species from our files and the most recent supplement to the *Manual of Flowering Plants of Hawaii* (Wagner and Herbst 2003). New status and range information was provided in 2007 by L. Pratt and A. Medeiros, U.S.G.S. Biological Resources Discipline; J. Jeffrey, U.S. Fish and Wildlife Service; T. Belfield, National Park Service; P. Moriysau, Volcano Rare Plant facility; J. Jacobs, U.S. Army Environmental Pohakuloa Training Area; and N. Agorastos, Hawaii Division of Forestry and Wildlife. In 2008, new information was provided by Linda Pratt and Kealii Bio, PEP Program. In 2009 we received new information from Patrice Moriyasu, Volcano Rare Plant Facility. In 2010, we contacted the species experts listed below and received no new information.

List all experts contacted:

Name	Date	Affiliation
Agorastos, Nick	02/09/10	Division of Forestry and Wildlife
Anderson, Stephen	02/09/10	National Park Service, Haleakala NP, Maui
Aruch, Sam	02/09/10	private contractor
Bakutis, Ane	02/09/10	Plant Extinction Prevention Program, Molokai
Ball, Donna	02/09/10	U.S. FWS, Partners Program, Hawaii Island
Beavers, Sally	02/09/10	National Park Service, Hawaii Island
Bily, Pat	02/09/10	The Nature Conservancy, Maui
Bio, Kealii	02/09/10	Plant Extinction Prevention Program, Hawaii Island
Brosius, Chris	02/09/10	West Maui Mountains Watershed Partnership
Caraway, Vickie	02/09/10	Hawaii Division of Forestry and Wildlife, Oahu
Ching, Susan	02/09/10	Plant Extinction Prevention Program, Oahu
Cole, Colleen	02/09/10	Three Mountain Alliance
Conry, Paul	02/09/10	Hawaii Department of Land and Natural Resources
Coordinator	02/09/10	East Maui Watershed Partnership
Duvall, Fern	02/09/10	Hawaii Division of Forestry and Wildlife, Maui
Fay, Kerri	02/09/10	The Nature Conservancy, Maui
Garnett, Bill	02/09/10	National Park Service, Kalaupapa, Molokai
Giffin, Jon	02/09/10	The Nature Conservancy, Hawaii Island
Haus, Bill	02/09/10	National Park Service, Haleakala NP, Maui
Higashino, Jennifer	02/09/10	U.S. FWS, Maui
Imada, Clyde	02/09/10	Bishop Museum
Jacobi, Jim	02/09/10	U.S.G.S., Biological Resources Division
Kawakami, Galen	02/09/10	Division of Forestry and Wildlife, Kauai
Kawelo, Kapua	02/09/10	U.S. Army, Environmental Division
Kier, Matt	02/09/10	U.S. Army, Environmental Division

Kiyabu, Brian	02/09/10	Amy Greenwell Botanical Garden
Kraus, Jim	02/09/10	U.S. FWS, Hakalau NWR
Medeiros, Arthur	02/09/10	U.S. Geological Survey
Misaki, Ed	02/09/10	The Nature Conservancy, Molokai
Moriyasu, Patty	02/09/10	Volcano Rare Plant Facility, Hawaii Island
Moses, Wailana	02/09/10	The Nature Conservancy, Molokai
Nakai, Glynnis	02/09/10	U.S. FWS, Refuges, Maui
Oppenheimer, Hank	02/09/10	Plant Extinction Prevention Program, Maui Nui
Palomino, Anna	02/09/10	Olinda Rare Plant Nursery, Maui
Palumbo, David	02/09/10	National Park Service, Haleakala NP, Maui
Pepi, Vanessa	02/09/10	U.S. Navy, Environmental Contractor
Perlman, Steve	02/09/10	National Tropical Botanical Garden
Perry, Lyman	02/09/10	Division of Forestry and Wildlife, Hawaii Island
Plunkett, Bryan	02/09/10	Lanai Forest and Watershed Partnership
Pratt, Linda	02/09/10	U.S.G.S., Biological Resources Division
Purell, Melora	02/09/10	Kohala Watershed Partnership
Seidman, Stephanie	02/09/10	Maui Nui Botanical Garden
Shishido, Glenn	02/09/10	Division of Forestry and Wildlife, Maui
Silbernagle, Mike	02/09/10	U.S. FWS, Refuges, Oahu
Smith, Miranda	02/09/10	Koolau Mountains Watershed Partnership
Starr, Forest	02/09/10	U.S. Geological Survey
Tanaka, Daniel	02/09/10	Puu Kukui Watershed Preserve
Ward, Joe	02/09/10	Puu Kukui Watershed Preserve
Welton, Patti	02/09/10	National Park Service, Haleakala NP, Maui
Wood, Ken	02/09/10	National Tropical Botanical Garden
Wysong, Michael	02/09/10	DLNR Natural Area Reserves, Kauai

The Hawaii Biodiversity and Mapping Program identified this species as critically imperiled (HBMP 2006). Based on the International Union for Conservation of Nature and Natural Resources Red List of Threatened Species, this species is recognized as Endangered (facing a very high risk of extinction in the wild) (Bruegmann and Caraway 2003). *Ranunculus hawaiensis* is included in the list of species in Hawaii's 2005 Comprehensive Wildlife Conservation Strategy (Mitchell *et al*. 2005).

COORDINATION WITH STATES

On February 11, 2010, we provided the Hawaii Division of Forestry and Wildlife with copies of our most recent candidate assessments for their review and comment. No additional information or comments were received.

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APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve:

Acting Carolyn A. Bohan
Regional Director, Region 1, Fish and Wildlife Service

5/18/10
Date

Rowan W Gould
ACTING
Director, Fish and Wildlife Service

October 22, 2010

Concur:

Do not concur: _____ Date: _____
Director, Fish and Wildlife Service

Director's Remarks:

Date of annual review: Date: April 21, 2010
Conducted by: Cheryl Phillipson, Pacific Islands FWO
Biologist, Prelisting and Listing Program

Comments:

PIFWO Review

Reviewed by: Christa Russell Date: April 26, 2010
Prelisting and Listing Program Coordinator

Marilet Zablan Date: April 26, 2010
Assistant Field Supervisor, Endangered Species Division

Gina Shultz Date: April 30, 2010
Acting Field Supervisor